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rather than enlighten, yet this can hardly justify the omission of the metaphysical altogether and the restriction to the social, economic, and legal aspects of the subject. The question is in the air and demands a thorough analysis to determine its really significant bearings.

And, finally, there is one other point which may seem a sin of omission in the eyes of some. In the description of the ideal life the more mystic traits fail to receive due consideration. This is perhaps due to the very excellence of the book as practical and common sense in all its positions, and yet that mystic life has been a persistent type from the days of the Greeks to our own times and its peculiar blessedness is intense and interesting enough for detailed consideration. To men of this type the democratic social good of our authors might seem a lower and uninteresting ideal.

But these perhaps inevitable omissions can weigh little against the general utility of the work both as to form and content. The references are abundant and interesting, the index and table of contents adequate, and the style fresh and vigorous. It should appeal not only to the special student of ethics, but to those in economics, politics, and sociology as well.

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The Application of Statistical Methods to the Problems of Psychophysics. F. M. URBAN. Philadelphia: The Psychological Clinic Press. 1908. Pp. 221.

This book covers three topics: a description of the author's experiments on judging lifted weights; an exposition of certain methods of applying the calculus of probabilities to psychological experiments; and a discussion of the metaphysical implications of the treatment of methods.

Finding from experiment that there was no difference of stimuli which would always be judged the same suggested that here was the empirical realization of underlying probabilities of judgments of certain kinds, and hence that the calculus of probabilities is applicable. This concept is first applied to the understanding of a cause, which is defined (p. 20) as "a group of conditions which gives a certain probability to the event." Whether variation in the results of an experiment is due to change in the controlled elements in this group of conditions or to change in the chance elements may be determined by comparing the results with the probability integral.

The second application of the concept of probability is to the method of finding the threshold of sensation. The threshold in the direction of increase of stimulus is defined as that amount of difference for which there is one chance out of two that a judgment "greater" will be given (p. 69). The method based on this definition makes it possible to avoid the disturbance due to expectation by presenting the stimuli in irregular order, without resorting to the so-called error methods for computing results. As had been shown previously, these error methods rule out the notion of threshold in any absolute sense, for they assume that the size of the just perceptible difference depends on the number of observations, and thus that theoretically there is no difference which can not sometimes be just perceptible. Furthermore, the author holds that his definition makes unnecessary the notion of sensational elements, the threshold being merely a difference possessing a certain probability of having a certain judgment passed upon it.

A third application of the concept of probability is made in developing the notion of psychometric functions, "the functions which give the dependence of the probabilities of the judgments on the differences of the stimuli" (p. 106). By supposing these functions to be analytic, finding them regular in the region of the threshold, and interpolating in this part of their course, values of probabilities for stimuli not actually tried are found. Thus the psychometric functions give a new method of computing the threshold and a method of comparing the point of subjective equality in different subjects. This point is found to be where the psychometric function of the judgments "equal" reaches its maximum. The author uses his experiments to illustrate step by step all three of his applications of the concept of probability.

To the reader with metaphysical interests the last chapter will be most suggestive. In this the author considers the relation of mental and physical facts in general. He maintains that mental phenomena tend to drop out of scientific discussion because of the use of the category of substance and the difficulties involved therein. He suggests that the category of relation avoids these difficulties. The most general form of a relation is that of a non-uniform, discontinuous function, but since a description with such functions can not be exhaustive, science restricts itself to uniform, continuous, analytic functions. In reply to the Moscow school of idealists, who hold that the existence of chance events and "half-analytic" functions shows that some events are not causally necessitated, it is pointed out that the randomness of such events is due to excessive complication of causes, and thus the calculus of probability is an argument, not for the lack of causality, but for uniform causality. The author finds that most arguments that the relation of mental and physical facts is an analytic function have assumed too much. They have gone as follows: There is a relation between the series of mental events and the moments of time; there is a relation—supposed by physics to be expressible in an analytic function—between the series of physical events and the moments of time; therefore, the relation between mental events and physical events is expressible in an analytic function. This argument either begs the question or is erroneous, because, unless the relation between mental events and the moments of time is an analytic function, which is the point at issue, it argues that the combination of an analytic and a non-analytic function gives an analytic function, which is not true. Dr. Urban disclaims any position as to the nature of the relation of mental and physical facts, but points out that the psychometric function, serving as the basis for an infinity of statements from a finite number of observations, is supposed to be analytic.

Dr. Urban's treatment of the application of the theory of probability to psychophysical experiments is a satisfying step toward exactness. Thus, to the question "What difference is just perceptible?" he adds the question "Just perceptible how often?" He has shown new ways in which the mathematical handling of the notion of probability may supplement actual experiment. When, however, we come to his treatment of the epistemological implications of his work we find it hard always to connect his experimental results with his metaphysical discussion. Thus, if he has merely shown that empirical data from psychophysical experiments may be subjected to a process of idealization like that used for physical observations, we can not feel that he has taken us very far. If his result is to show that as the difference in stimuli increases the probability that this difference will be recognized increases, we are grateful for making exact a result of common experience. If, as the careful discussion of the relation of mental and physical facts would seem to indicate, we are to infer that the nature of the relation involved in the psychometric function may some time give us a hint of the nature of the relation of mental and physical states, it seems that the psychometric function will be extremely useful in itself, but will not supply the epistemological relief indicated. The psychometric function shows the relation of the probability of certain judgments to the stimuli. The judgments are the result of a group of causes composed of the stimuli and the psychophysical condition of the subject. A function which shows the relation of the predictability of this result to one factor in the group of causes is valuable in itself, but can it throw much light on the relation of causes within the group, on the relation of the stimulus to the psychophysical condition of the subject?

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JOURNALS AND NEW BOOKS

ZEITSCHRIFT FUR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. May 5, 1908, Bd. 47, Heft 3. *Abteilung für Psychologie. Untersuchungen über die Temperatursinne* (pp. 161–202): SYDNEY ABRUTZ. – First part of the report of an investigation of some of the still unsettled questions in the psychology of temperature sensations. The reaction times to the paradoxical cold sensation and the sensation of heat are found to be identical, and about twice as long as the reaction time to the sensation of warmth. The reaction time to heat, for the same stimulus (+ 50° C.), varies with the skin area. Reaction time to heat on a given area decreases with increase of the intensity of the stimulus. The absolute stimulus limen for heat varies directly with the local skin temperature, the relative limen becoming lower as the skin